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APPLICANT : HITACHI LTD;

INVENTOR : KURODA TETSUO;

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TITLE : MULTI-LAYERED OXIDE-METAL FILM AND ITS PRODUCTION

ABSTRACT : PURPOSE: To obtain multi-layered oxide-metal films having good thermal stability and light selective transmittability by alternately laminating thin oxide films consisting of a light transmittable oxide and thin metallic films consisting of metals of at least one kind among 3d-5d transition metals.

CONSTITUTION:  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$ ,  $\text{Y}_2\text{O}_3$ , etc., are usable as the light transmittable oxide. After  $\text{SiO}_2$  is sputtered on a glass substrate, Fe and Cu which are the 3d transition metals, Mo, Pb, and Ag which are the 4d transition metals, and Ta and Au which are the 5d transition metals are respectively sputtered on the respective glass substrates to form the oxide layers and metallic layers. Sputtering is alternately executed in the stage of forming the oxide layers and metallic layers. The wavelength or wavelength width of the transmitted light has the tendency that the wavelength of the transmitted light is shorter as the transition metals are 3d  $\rightarrow$  4d  $\rightarrow$  5d. The wavelength of the transmitted light can be, therefore, controlled simply by providing the multi-layered films sandwiching the metallic elements having suitable d electron numbers with the oxide.

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